Rural Electrification Approaches in West Africa

Some reflections

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Rural Electrification Approaches in West Africa

Some reflections

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Outline of Presentation

- Approaches in West Africa – an overview
- Ethnographic research on village institutions
- Experiences from Burkina Faso
- Future research agenda

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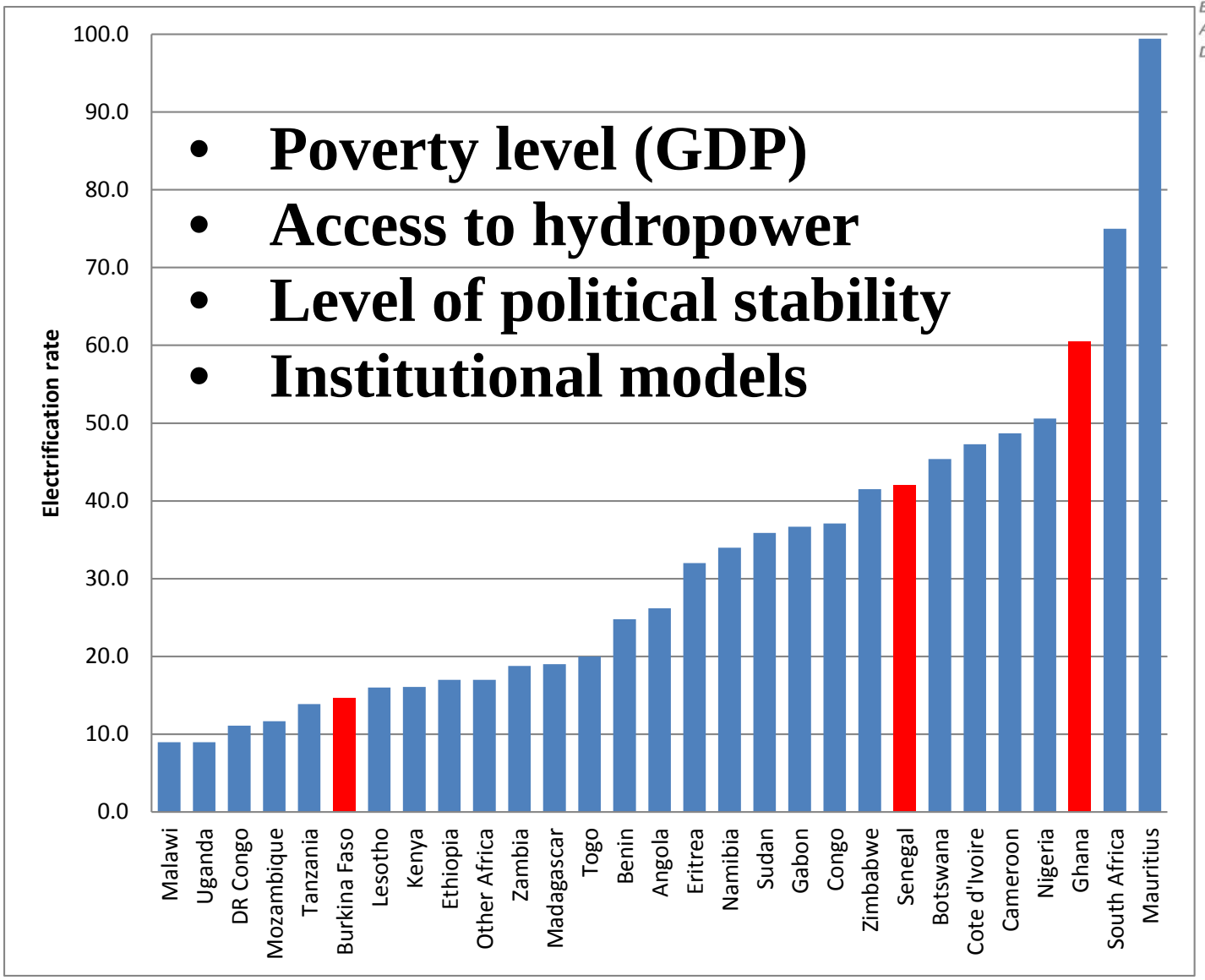
Electricity access in 2009



- **Poverty level (GDP)**
- **Access to hydropower**
- **Level of political stability**
- **Institutional models**

Source: IEA, World Energy Outlook, New electricity access database, 2011

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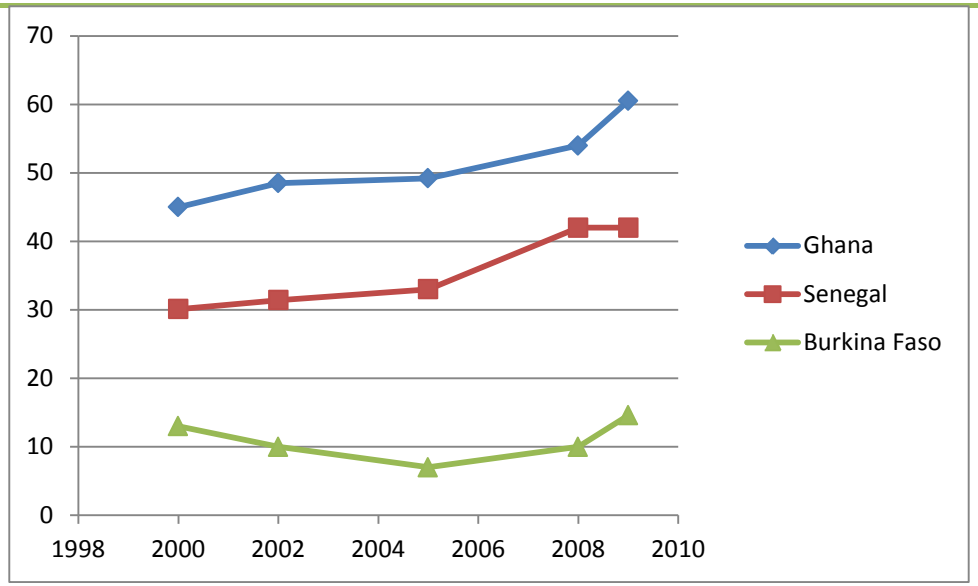
Approaches to Rural Electrification

Country	Approach	Electrification rate %
Ghana	Utility + selfhelp - Rural electrificatin agency	60
Senegal	Utility + concession + spontaneous private	42
Mali	Utility + concession + spontaneous private	11 ?
Burkina Faso	Utility + planned cooperatives	15



Source: IEA WEO

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Utility

Opportunities

- Access to technical expertise
- Economy of scale
- Opportunities for cross subsidizing from urban to rural

Challenges

- Often conservative in approach (e.g. SWER)
- No tradition for community involvement
- Seen as part of the state by consumers
- Often "negative" political influence

Concessions

Opportunities

- Access to international knowhow and finance
  - ONE, EDF
- Economy of scale
  - in investment
  - in operation
- Favours innovative systems
  - such as hybrid PV/diesel

Challenges

- Time consuming to prepare tender material and conditions
  - six concessions in Senegal after 10 years
- Difficult to attract foreign/local investors
  - The concession system has been abandoned in Mali due to that reason
- Size of concessions
  - Mali (8 +10), Senegal (10)
- Verification and control

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Community participation

Opportunities

- More democratic
- Ensuring local needs
- Easy access to land for poles and lines
- Donor-support
  - Support from donor constituencies

Challenges

- Expertise
  - technical, financial
- Poverty level
  - high subsidy rates necessary
- Commitment/dependency
  - high subsidy rate
- Financial management
  - Satisfaction of other needs
- Local conflicts

Community ownership hybrids

- Ghana: Self-help village committee
  - Show commitment buying poles and 30 % wiring
- Mali - Senegal: Spontaneous private/community
  - Showing interest to a private operator
  - Responsible for operation and maintenance
- Burkina Faso: Planned cooperative
  - Responsible for ownership and operation with outsourcing of responsibility to private operator
- Multifunctional platform
  - Women being responsible for ownership and operation

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Ethnographic research on community involvement

- Planned intervention literature
  - Sardan, Bierschenk, Blundo, (APAD)
  - Norman Long (Wagening)
  - David Mosse (SOAS)

- Concepts
  - Development interfase
  - Interests, conflicts
  - Negotiation, mediation
  - History vs. tabula rasa
  - Hidden transcripts

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Research on village institutions in Burkina Faso

- Institutions
  - Village groups
  - Cooperatives
  - Municipalities
- Why participate ?
  - Access to network and resources
  - secondary benefits
  - access to new projects
  - symbolic (honour)
- Who participate ?
  - Elite dominance
  - VG. - new comers and weaker groups
  - Municipality - ruling elite
  - Cooperative – wider consensus
- How ?
  - Leadership through patronage
  - Few meetings
  - Few and symbolic actions
  - Economic management is difficult

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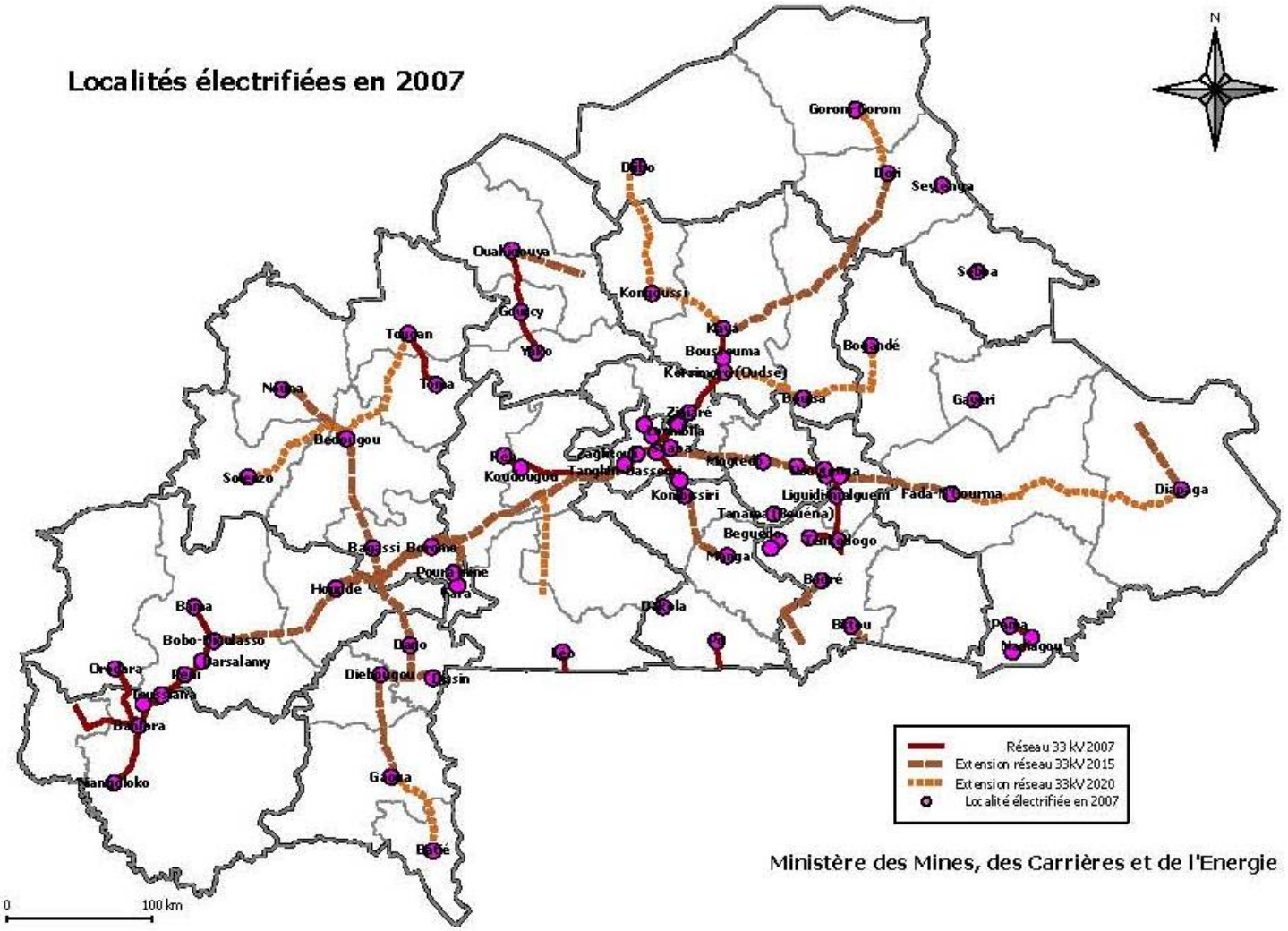
Rural electrification in Burkina Faso

Institutional framework

- Unbundling and privatisation of utility envisaged by law in 2001
- Rural electrification fund *(Fonds de Développement d'Electricité)* created in 2002.
- Utility responsible for overall transmission system and for extension of existing electrified areas
- Rural electrification fund responsible for new electrification schemes in rural areas
- Donor support to rural electrification fund to be in charge of implementation, loans and subsidies
- Private sector involvement entailed abandoning unified tarifs



Source: Vision 2020 de l'accès aux services énergétiques modernes au Burkina Faso

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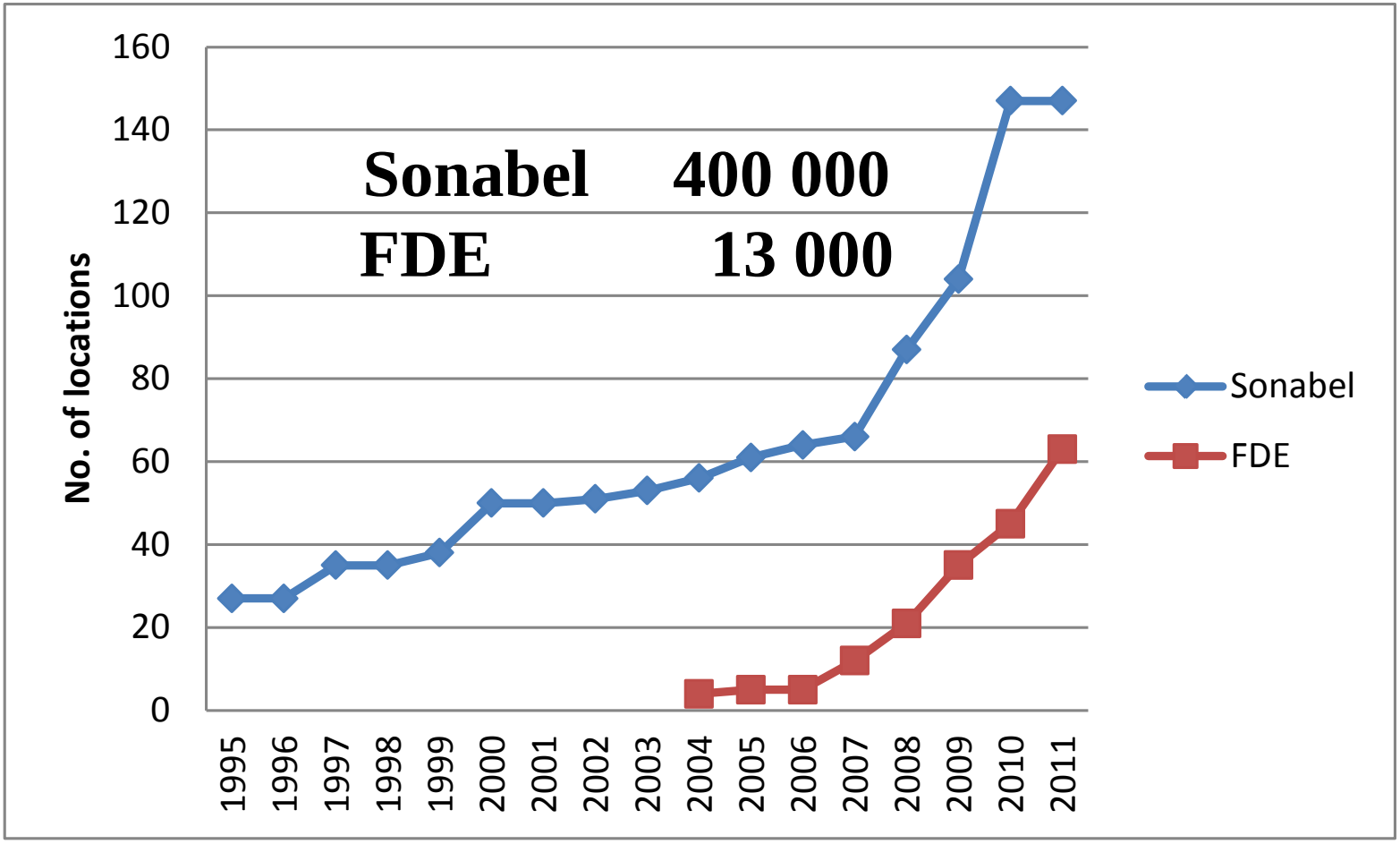
Electrification by Utility and REA



Source: Sonabel annual report 2011, and list of electrified towns (FDE, 2011)

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Two solutions for rural electrification

Stand alone (16)

- Production
  - Diesel unit
  - Hybrid PV/diesel
  - Platforme
- Distribution grid
- Installations, meters

Grid connection (44)

- Transmission line, SWER
- Transformer
- Distribution grid
- Installation, meters

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Size of electrified towns (diesel)

	2004	2007	2008	2010	2011	Total
Diesel	**9782**	**16398**	**13295**	**12327**	**9699**	**61501**
Arbinda					9699	9699
Bagassi		4188				4188
Batié		7394				7394
Ouargaye			13295			13295
Sapouy		4816				4816
Sebba	5350					5350
Seytenga	4432					4432
Solenzo				12327		12327
Hybrid PV/diesel					**14374**	**14374**
Déou					8808	8808
Markoye					5566	5566
Multifonctional platform				**18115**		**18115**
Douma				4174		4174
Goutoula				1850		1850
Pella-Tibtiguia				2470		2470
Tangaye				3724		3724
Tougue				3325		3325
Touya				2572		2572
Grand Total	**9782**	**16398**	**13295**	**30442**	**24073**	**93990**

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Overall organisational setup

Public sector

- Ministry of Energy
  - Overall planning
  - Concession
- Rural electrification fund (FDE)
  - Detailed planning
  - Implementation
  - Follow up
  - Subsidy
  - Loan

Private sector

- Local Consultants
  - Feasibility studies
    - on behalf of FDE
  - Tendering
    - on behalf of Coop
  - Training of cooperatives
- Cooperatives
  - Owners)
- Entrepreneurs
  - Builders and operators

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Mini - grids

Cooperative

- Owner of the diesel unit, and the grid
  - 60 % subsidy from the rural electrification agency
  - 40 % loan, 3 year grace, 10 years pay back time
  - 1 % equity capital from members
- Responsible for
  - Fuel cost,
  - maintenance costs
  - Grid extension

Entrepreneur

- BO –agreement (tender)
  - Building the system
  - Operation & management, for 5 years included in the tender.
  - New contract after 5 years ?

Consumer

- Member fee (20 USD)
- Connection fee (payed back over 3 years)

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Grid connected – mini grids

Cooperative

- Owner of transformer and distribution grid
  - Transmission line (100 % subsidy, owned by utility)
  - 60 % subsidy from the rural electrification agency
  - 40 % loan, 3 year grace, 10 years pay back time
  - 1 % equity capital from members
- Responsible for
  - Payment of electricity at the transformer
  - maintenance costs
  - Grid extension

Entrepreneur

- BO –agreement (tender)
  - Building the system
  - Operation & management, for 5 years included in tender.
  - New contract after 5 years ?

Consumers (members)

- Member fee (20 USD)
- Connection fee (payed back over 3 years)

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Economic implications

Original system (2004)

- Cost based tariffs,
  - 150-250 % of grid tariffs
- Fuel tax exemption
  - (2004/2008)

Consequences

- Discontent
- Indebted cooperatives
  - postponement of payment
- Ad hoc support
  - crises solutions

Adapted system (2010)

- Fixed tariffs
  - comparable to grid tariffs
- Subsidized fuel
- Subsidized reinvestment
- Reduced bulk tariff

Consequences

- Detailed regulation
  - transparency ?
- Commitment / ownership
  - dependency ?

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Cooperative with build and operate contract

Why Cooperatives ?

- Few private operators interested and capable of financing/owing the systems
- High level of donor financing (60/40) was not considered politically acceptable for a private sector solution

Why Build and Operate ?

- Cooperatives have low organisational and technical capacity

Problems in Build and Operate

- Operator has limited incentives to increase revenue and to reduce costs
  - Fuel, maintenance
  - Including new consumers
- Low organisational and technical capacity of Coops means
  - Low level of influence
- Cooperatives take all risks, but have low capacity to act

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Towards more private responsibility
From BO to BOO(T)

Advantages in BOO(T)

- Incentive structures are right, in order to reduce costs and increase income
  - connecting consumers
  - reduce costs (fuel, management)
- Cooperatives have lower risk or no risk

Considerations

- To be efficient it needs strong companies, which can afford to take risks
- Tendering is only fruitful if there are many operators
- Negotiated agreements need a strong regulator to control the profit

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Cooperatives as owners of distribution systems

- Cooperatives were newly established as a condition for being included in the rural electrification scheme and had no tradition for being responsible for businesses
- Equity of cooperatives was low, about 1 %
- In spite of being the formal owners the cooperatives remained weak in comparison to all the other actors involved – the rural electrification agency, the consultants and the entrepreneurs
- Cooperatives were in general not able to take the necessary decisions and to negotiate with the operator, and their financial room for manoeuvre was limited after the first investment
- Cooperatives often didn't see any real interest in being independent of the donor funded rural electrification agency. Their strategy seemed rather to be dependent on FDE in case something went wrong

Lessons learned

Cooperatives

- Capacity
  - experience in business and in negotiation with service providers is crucial
- Commitment
  - higher equity level increases responsibility (10-20 %) but is impossible in practice
- Dependency
  - Many strong external actors make dependency the most rational strategy
- Conflicts
  - internal - between cooperative and management company
- **Management contract not enough**
  - Economic and technical capacities of cooperatives are also needed when operation is transferred through a management contract
- **Privatisation an option**
  - BOO contracts or concession to private enterprises may be a better solution if there is competition among potential entrepreneurs

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Lessons learned
Utility vs. Reneable Energy Agency

- Creating a new structure for electrification outside the utility has some advantages in terms of new solutions, such as e.g. SWER, cooperatives and non-unified tariffs

- However, it takes time to build up a new private sector system - in parallel to the utility - consisting of:
  - Rural electrification fund
  - Consultants
  - Entrepreneurs
  - Cooperatives

- It was not politically acceptable to maintain significantly higher tariffs in rural compared to urban areas.

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Future research

How will innovative technical solutions impact on organisational change

Technical solutions

- Mobile phones
- Phone banking
- Distant control and management

Impact on organisation

- Local politics
- Leadership in village institutions
- Economic management
- Ownership/Financing

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Thanks for your attention !